## I. IN THE CLAIMS

Please amend the claims as indicated below.

1. (original) A method of predicting behavior of a characteristic of an electric submersible pump application, comprising:

a. generating a training data set comprising data representative of an electric submersible pump application, the data related to at least one predetermined characteristic of the electric submersible pump application;

b. establishing an initial neural network model for the electric submersible pump application, the neural network model related to the at least one predetermined characteristic of the electric submersible pump application;

c. using the training data set by the initial neural network to create a predictive model of behavior of the at least one predetermined characteristic of the electric submersible pump application;

d. obtaining measured electrical submersible pump application operational data; and

e. adapting the neural network using the measured electrical submersible pump application operational data to create a predictive model of behavior of the at least one predetermined characteristic of the electric submersible pump application.

2. (original) The method of claim 1, wherein:

a. the training data set is generated from a deterministic model of an electric submersible pump application.

3. (original) The method of claim 2, wherein:

a. the deterministic model comprises mathematical algorithm based on engineering and physics principles that model the behavior of an electrical submersible pump application.

4. (original) The method of claim 2, wherein:

a. the training data set comprises a plurality of data sets generated from the deterministic model of an electric submersible pump application obtained using at least one mathematical algorithm based on engineering and physics principles that model the behavior of an electrical submersible pump application.

5. (original) The method of claim 2, wherein:

a. the data set is obtained from data related to the electric submersible pump application as installed and used in a real world environment.

6. (original) The method of claim 1, wherein:

a. the neural network comprises at least one of (i) a weight matrix, (ii) a topology of neural network, (iii) a training algorithm, or (iv) an activation function.

7. (original) The method of claim 6, further comprising:

a. adjusting the weight matrix using a training algorithm that corresponds to the neural network to predict actual behavior of the electric submersible pump application by minimizing a training error.

8. (original) The method of claim 1, further comprising:

a. using a predetermined output of the neural network to aid with at least one of (i) data matching of historical measured data versus the output, (ii) fault diagnosis of the electric submersible pump application, or (iii) prediction of an operational characteristic of the electric submersible pump application.

9. (original) The method of claim 1, wherein:

a. adaptation of the neural network is self-adaptation.

10. (original) A method of predicting behavior of an electric submersible pump application, comprising:

a. providing a learning stage, further comprising:

i. modeling a behavior of an electric submersible pump application using at least one deterministic mathematical algorithm based on engineering and physics principles that model the behavior of an electrical submersible pump application;

ii. generating a training data set comprising data related to the behavior of a electric submersible pump application from the modeled behavior;

iii. providing the training data set to an initial neural network; and

iv. creating a neural network model of a predetermined characteristic of the electric submersible pump application;

b. providing a testing stage, further comprising:

i. obtaining a measured data set for the electric submersible pump application; and

ii. generating at least one output from the neural network related to the predetermined characteristic of the electric submersible pump application for a validation purpose; and

c. providing an adaptive stage, further comprising:

i. iterating the neural network model to refine a predicted electric submersible pump application behavior.

11. (original) The method of claim 10, wherein:

a. the behavior model of the electric submersible pump application is dependent on a predetermined number of inputs and outputs related to behavior of an actual electric submersible pump application.

12. (original) The method of claim 10, wherein:

a. the behavior model is useful for at least one of (i) a prediction of a desired behavior of an actual electric submersible pump application or (ii) adaptation of a desired behavior of an actual electric submersible pump application.

13. (original) The method of claim 10, wherein:

a. the at least one output from the neural network related to a desired characteristic of the electric submersible pump application comprises at least one of (i) a simulated value for the predetermined characteristic of the electric submersible pump application or (ii) a calculated value for determined characteristic of the electric submersible pump application.

14. (original) The method of claim 10, further comprising:

a. obtaining real world data related to actual behavior of the electric submersible pump application;

b. providing the real world data to the neural network; and

c. using the real world data during the iterations of the behavior model to create successive revisions of the neural network of the electric submersible pump application to refine the predicted electric submersible pump application behavior.

15. (original) The method of claim 10, further comprising:

a. comparing a predetermined output of the behavior model of the neural network to a real world datum for a desired behavior modeled by the neural network.

16. (original) The method of claim 10, further comprising:

a. using the neural network to provide automated interpretation of real world data related to the electric submersible pump application.

17. (currently amended) A system for modeling behavior of a electric submersible pump application, comprising:

a. a computer;

b. a data store operatively in communication with the computer;

c. a training data set generator adapted to generate a training data set comprising data stored in the data store, the training data set related to behavior of a electric submersible pump application;

d. a source of measured data for the electric submersible pump application operatively in communication with the computer, data from the source of measured data being storable in the data store; ~~and~~

e. a software modeler adapted to provide a learning stage, the learning stage comprising modeling a behavior of an electric submersible pump application using at least one deterministic mathematical algorithm based on engineering and physics principles that model the behavior of an

electrical submersible pump application, providing the training data set to an initial neural network, and creating a neural network model of a predetermined characteristic of the electric submersible pump application; and

f. a neural network model of the electric submersible pump application, the neural network resident in the computer, the neural network able to utilize the training data set and measured data to manipulate a model of the submersible electrical pump application and generate at least one output related to the predetermined characteristic of the electric submersible pump application for a validation purpose.

18. (currently amended) The system of claim 17, wherein:

a. the neural network model is an adaptable neural network adapted to be interated to refine a predicted electric submersible pump application behavior.

19. (original) The system of claim 18, wherein:

a. the adaptable neural network model is self-adaptable.